POPULATION TODAY

Vol. 18, No. 2 February 1990

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FROM THE EDITOR'S DESK

Even as *PT* reported last month on the population decline in many major American cities (January 1990, pages 8 and 10), we were reminded just how humbly these metropolises began.

As recently as 1789, New York City occupied only the very tip of Lower Manhattan and was so small that Wall Street was part of Midtown and a contemporary map included a scale given in feet. A north-south road labeled "to Boston" coursed through empty farmland that would someday be the East Village. In that Constitutional year the Empire City, already the nation's largest, had a population of about 33,000, up from 4,375 in 1703.

Tables from the Colonial 1703 Census give the names of the "Masters of Familys" and offer a singular peek into the culture—not to mention spelling—of the time. The printer's term "Sic" (meaning this-is-no-typo-honest!) should also be placed by each of the following respondents, typical of their day: ffrans Vandyck, Wm Proovoost, Allebertuz Ringo, and some comparatively straightforward ones such as Tobias Stoutenbrough, Cornelia Vandervoers, and Anthony Farmer.

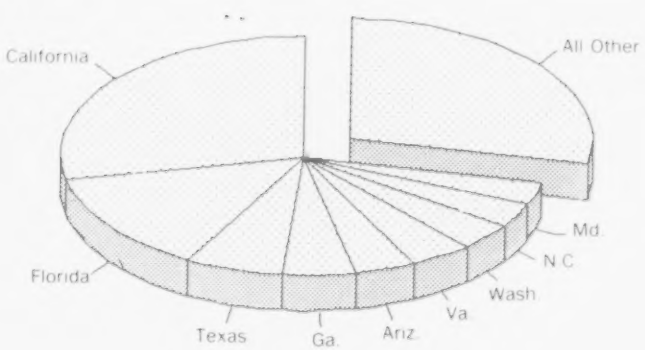
Boston, the most populous city during most of the pre-Independence era, was then 99-percent an island, connected to the Massachusetts mainland by the most slender of isthmuses. Because of energetic landfill projects since then, the shape of Boston has changed almost beyond recognition.

Finally, an enumeration of Philadelphia in 1749 (2,076 houses counted) was conducted by "citizens of the first respectability." Mulberry ward was counted by one Dr. Franklin.

—Carl Haub

SPEAKING GRAPHICALLY

States with the Most Population Growth: 1985-1988



California and Friends. The U.S. population rose by 9.5 million from 1985 to 1989—a 4.0 percent gain—but the increase was a pie divided up mostly by California and a handful of other states (see figure). The Golden State alone accounted for more than one-quarter of U.S. growth. It and eight other states were the heftiest gainers, each swelling by at least 300,000 people. Collectively, the nine accounted for nearly three-quarters of the nation's population growth during the period.

Source: U.S. Census Bureau press release CB89-204.

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Recycled Paper

1990 Census Forms Ready to Roll

It's too late to turn back.

In California, Maryland, and Utah, hundreds of truckloads of census questionnaires are being assembled for mailing (see below). The hiring of hundreds of thousands of temporary workers for the spring's tabulation and follow-up operations has been launched. Meanwhile, litigious strife lurks in the shadows, as usual.

In short, it's a typical decennial census year. And April 1, 1990—Census Day—is now only two months away.

The TIGER address lists, which locate housing units coast to coast, have been completed—which is fortunate, because the census is primarily a mailing operation.

The next step is staffing the 484 temporary district offices scattered around the country. Each office has half a dozen or so management, and the hiring of these managers is reportedly going well.

Each district office will also require some 600 to 950 field employees (earning $5.00 to $8.00 per hour) and 175 to 450 clerical workers (earning $4.50 to $7.00 per hour). Hiring for these temporary staff positions—the foot soldiers of the census—is at a very early stage, with testing of job applicants yet to begin. There is still time, because these 300,000 workers will be needed mostly in the post-Census Day stage, when census forms are logged in and follow-ups are conducted.

The Census Bureau is paying higher rates in areas with high living costs, such as New York City. If you'd like to work in the census, call telephone information for the phone number of the temporary district office nearest you, or contact your state employment office.

On the Legal Front

Meanwhile, the complications over census adjustment are far from over. The Commerce Department is now receiving comments from the public concerning the adjustment guidelines issued last December (see *PT*, September 1989 and January 1990).

The census advisory board, left to right: seated, Eugene Ericksen, John Tukey, and Lance Tarrance; standing, Kirk Wolter, Leobardo Estrada, Michael McGehee, and Ken Wachter. Not shown, William Kruskal.

Any decision to adjust will be made by Secretary of Commerce Robert A. Mosbacher, whose department includes the Bureau of the Census. He will give due consideration to recommendations made individually by the special advisory panel on census adjustment, appointed in September 1989 as part of the out-of-court settlement of the New York suit.

For the record, the members of the Secretary of Commerce's adjustment advisory board are:

Eight-member panel studying thorny issue of census adjustment

- Eugene R. Ericksen, Professor of Sociology, Temple University.
- Leobardo F. Estrada, Associate Professor, Graduate School of Architecture and Urban Planning, University of California at Los Angeles.
- William Kruskal, Ernest DeWitt Burton Distinguished Service Professor of Statistics, University of Chicago.
- J. Michael McGehee, President, McGehee and Associates.
- V. Lance Tarrance, Jr., Chief Executive Officer, Tarrance Associates.
- John W. Tukey, Professor of Statistics Emeritus, Donner Professor of Science Emeritus, Princeton University.
- Kenneth Wachter, Professor of Demography and Statistics, University of California at Berkeley.
- Kirk M. Wolter, Vice President, A.C. Nielsen Company.

Under terms of the settlement, four of the panelists were named by Commerce from a list of seven submitted by the New York plaintiffs. The other four were Commerce's choice.

The four panelists chosen from the names on the plaintiffs' list are Ericksen, Estrada, Tukey, and Wolter, while Commerce's choices were Kruskal, McGehee, Tarrance, and Wachter.

Co-chaired by Ericksen and Tarrance, the panel has contributed input to the Commerce Secretary's adjustment guidelines, to be issued in final form Mar. 10, 1990, after the public has had a chance to comment. And they will be active for a long time after Census Day, during the period when the census totals are processed and a postenumeration survey taken.

The panelists' recommendations as to whether to adjust the 1990 Census for undercount will be issued individu-

Continued on next page

Census Day

Continued from previous page

ally (the panel as a body will not issue a collective recommendation), sometime before July 15, 1991, when the Secretary makes his decision.

Questionnaire Status

Meanwhile, over 100 million questionnaires are being readied. Each packet consists of five elements: outer envelope, questionnaire (printed on custom-made quality paper for reliable machine reading), instruction guide, "motivational insert," and first-class business reply envelope. The resulting printing job is so huge and so expensive that many contractors and subcontractors are involved. For the short form alone, 5,000 tons of paper and 2,700 pounds of ink will be needed, and the printer's bill will be $18 million.

To reach respondents, each form will have its unique destination address (from the Census Bureau's TIGER address list) printed directly on the back, visible through the window envelope. Each questionnaire will also carry a unique bar code to enable personnel in the seven regional processing centers to check in forms instantly as they arrive in the mail, and determine by process of elimination, what addresses have not yet responded and require follow-up. (Later, during processing at the seven national processing centers, the machines that "read" respondents' answers off questionnaires are incapable of reading individual names and addresses, and only record the census block from which the data came.)

The short form will ultimately enter the postal system from two points of origin: Frederick, Md., and Clearfield, Utah. The thicker long form, which includes an additional 16 pages of questions saddle-stitched inside, goes to 17 percent of households and will be mailed from San Bernardino, Calif.

The finished census forms will be boxed in order, the boxes placed in order on forklift pallets, which themselves will be carefully ordered by destination. In early February the Postal Service will start taking delivery of the pallets at the Bureau's loading docks, following a massive timetable specifying exactly which pallets go where, and when. The mailout will get thrifty bulk rates (the mailback goes first-class). Total mailing costs should be about $25 million. And if all goes well, on or about the target date of Friday, Mar. 23, when Americans open their mail boxes, out will fall a census packet.

Of the 97 million addressed questionnaires, about 88 million will be mailed, to be filled out and mailed back. Another 11 million, destined for rural areas, will be hand delivered by enumerators for respondents to mail back.

The remaining 6.5 million households will receive questionnaires hand-delivered by enumerators scouting for addresses not already on the Bureau's address rolls. The Census Bureau is out to find everyone. —*A.H.*

Viet Nam's Fertility Falls

Viet Nam, the world's 13th most populous country since its unification, recently shed some light on its demography with the release of new survey data. The 1988 Demographic Survey of Viet Nam indicates that the birth rate has been falling steadily over the past decade, although the precise level of fertility is less clear. The landmark survey estimates that fertility fell from a total fertility rate of about 5 lifetime children per woman in the late 1970s to about 4.1 in 1987. Vital rates were put at 31 to 34 births per 1,000 population in 1989 and the death rate was estimated at 7 to 8.

Assuming these parameters are correct, the country's population would be 68 million by 1989 and the growth rate would be about 2.4 to 2.6 percent per year. The government's goal had been to reduce the growth rate to 1.9 percent by 1990, a target that is clearly unattainable. Further, the expense of maintaining an effective family planning program is proving to be a major obstacle in an economy which has suffered badly since 1975. —*C.H.*

Conference To Chart Population's Impact

Designed to help policymakers and planners understand coming U.S. demographic shifts, "America in the 21st Century" is an all-day conference to be held in Washington, D.C., on Thursday, Mar. 29, 1990.

Organized by the Population Resource Center, the conference is part of a joint project of the Center and the Population Reference Bureau, and is sponsored by a grant from the Ford Foundation.

In the morning, the meeting will feature discussions by public and private sector leaders on the policy choices that U.S. demographic trends pose for the 21st century. Sessions held that afternoon will focus on specific facets of these trends and their interrelationships: "Correcting the Mismatch: People and Jobs"; "Supporting America's People" in terms of social and economic support systems; "How Firm the Foundation?" concerning future infrastructure needs; "Our Environmental Challenge"; "Governing in the 21st Century"; and "The U.S. and the Changing World."

Led by a total of 24 experts, the concurrent sessions are based on PRB's continuing series of "21st Century" reports. The conference's plenary forum will be moderated by journalist Hodding Carter. Keynote presentations will be made by former San Antonio mayor Henry Cisneros and Maurice F. Strong, President of the World Federation of United Nations Associations.

Registration for "America in the 21st Century" is $150 through Mar. 1 ($175 thereafter), which includes lunch and the complete "21st Century" publication series. To obtain further information or to register, contact: Shelley Kossak, Director of Domestic Programs, Population Resource Center, 1725 K St., N.W., Suite 1102, Washington, D.C. 20006. Phone (202) 467-5030. —*A.H.*

SURVEY REPORT

Mexico

With 87 million people, Mexico is now more than one-third as populous as the U.S., and ranks as Latin America's second most populous country, after Brazil. Since 1972, when President Luis Echeverria Alvarez made a dramatic policy about-face and announced support for a strong national population policy, the government has actively promoted provision of family planning services.

In large part due to favorable economic and social conditions as well as tacit acquiescence by the Church, Mexico's top-down, government-initiated approach to family planning has had considerable impact on fertility in the last decade. The results of the 1987 National Survey of Fertility and Health (ENFES) show that from 1973 to 1986, the total fertility rate (TFR) declined from an average 6.3 lifetime children per woman to 3.8. Urban rates were cut in half, while rural rates declined by one-quarter.

Knowledge and use of contraceptives has risen considerably. Ninety percent of females know of the pill, and in the 10 years between 1976 and 1986, use of modern contraceptive methods nearly doubled, from 23 percent to 45 percent. Interestingly, the composition of contraceptive use also changed significantly over the same period: The pill has declined significantly as a proportion of all methods used, whereas female sterilization has shot up to first place—from 9 percent of all methods in 1976 to 36 percent in 1986. IUDs have held steady at roughly 18 percent, making them currently the second most popular form of contraceptive.

The reason for the relative increase in sterilizations is the number of older women who decide to stop bearing children after their fourth or fifth child. A rise in the percentage of women who obtain services from hospitals and health clinics (where sterilizations are available) rather than pharmacies has also been noted.

FAO/F. Botts

Mexico's new generation.

Of those women who have been sterilized, 25 percent had health problems that they attributed to the operation. The highest percentage of "unsatisfied customers" was in the 25-34 age group, 12 percent of whom wished they hadn't received the operation. Reasons cited were the desire for more children (43 percent), physical problems (20 percent), and the fact that they hadn't wanted the operation in the first place (20 percent).

Contraceptive prevalence rates mirror changes in desired family size. Women aged 15-19 who are entering their reproductive years plan to have an average of 2.6 children, whereas women near the end of their reproductive years expect to have 4.

Sixty-two percent of women with no schooling wish to stop childbearing, as compared with only 49 percent of women with secondary schooling. This seemingly anomalous result is most likely a statistical artifact related to differences in the ages of the two groups; as education has spread, women with no schooling tend to be older and have higher parity. Interestingly, although they may wish to stop childbearing, they are 10 times less likely than their more educated counterparts to use modern contraceptive methods.

Infant mortality rates (IMR) have declined from 85 to 47 infant deaths per 1,000 live births between 1970 and 1987. In part this trend is a result of several factors: a decline in high-parity births, an increase in spacing between births, and fewer births among women in their teens and 40s. The ENFES data show that fourth- through sixth-parity infants have IMRs half again as high as first-borns (42 and 60, respectively). Similarly, birth intervals of less than two years produce IMRs almost twice as high as those of two years or more (81 and 44, respectively).

Sixty-seven percent of the women interviewed received prenatal care from a doctor. The percentage is much higher among urban and highly educated women.

Breastfeeding exhibits the tendency found in most other countries, with the rural poor demonstrating a greater propensity to breastfeed than urban dwellers. Nevertheless, the overall percentage of women who nursed their children was relatively high—ranging from 80 to 90 percent for the various age and educational groups.

—A. deS.

DEMOGRAPHER'S PAGE

A Short History of U.S. Policy Toward Illegal Immigration

by Thomas J. Espenshade

By definition, the United States did not have illegal immigration before 1875. Prior to that year, anyone who wanted to come here could. The only regulation (implemented in 1820) required ship captains to keep manifests of alien passengers arriving at U.S. seaports.

In 1875, exclusion of certain groups became law. Later, in 1921, numeric restrictions on immigration totals were imposed for the first time. Today, at least 33 specified grounds for exclusion are embodied in U.S. immigration law. These include involvement in criminal, immoral, or subversive activities; physical or mental handicaps; and economic factors that suggest migrants would be a drain on the welfare system or would compete unfairly with American workers for jobs. In addition, some migrants who enter the country legally may later become illegal immigrants if they abuse the terms of their visas.

As laws tightening entry into the United States have multiplied, so too have the number of illegal aliens apprehended within U.S. borders. These two trends have tended to go hand in hand. The legal apparatus expanded the criteria by which persons were considered to be in the country illegally, thereby putting more people at risk of being apprehended. But perhaps more importantly, the perceived growth in the number of illegal aliens residing in the United States revealed the inadequacy of previous legislation to contain the situation and gave rise to new demands to "do something" about the problem. The interplay between these two forces is briefly sketched in this article.

The Early Years

Legislative and policy concerns over illegal immigration to the United States have only recently become centenarians. During the last quarter of the 19th century, rising numbers of European immigrants coincided with changes in the composition of immigrant streams. In little more than a decade, the majority proportions shifted from Northern and Western Europe to Southern and Eastern Europe, prompting Congress to respond with a variety of measures aimed at controlling entry into the country.

In 1875, Congress passed this country's first exclusion law, which barred convicts and prostitutes from U.S. shores. The Chinese Exclusion Act was passed in 1882 prohibiting the immigration of Chinese laborers to the United States. Concerns about illegal immigration were reflected in laws enacted in 1888 and 1891 that permitted first the deportation of workers and later the expulsion of any aliens who had entered the country illegally.

Coincidentally, 1891 also marked the creation of the Bureau of Immigration—the forerunner of today's U.S. Immigration and Naturalization Service (INS). By 1904 it became apparent that the Chinese Exclusion Act was not fulfilling its intended purpose, and the Commissioner-General of Immigration assigned a small group of mounted inspectors to patrol the southern border to halt the smuggling of Chinese laborers through Mexico.

During the early part of the 20th century, Congress expanded its control over immigration policy by introducing the first numerical restrictions on immigration. Measures passed in 1921, 1924, and 1929 were designed not only to restrict overall immigration but also to limit immigration from certain areas. Quotas were imposed that based immigration from each country on the share of the U.S. population having similar ancestry.

These "national-origin quotas" had the effect of discriminating against Asians and immigrants from Southern and Eastern Europe and were not lifted until 1965. In addition, these quantitative limitations, combined with the outbreak of the Mexican Revolution in 1910, served to intensify illegal migration. To counter this, the U.S. Border Patrol was created in 1924 as the uniformed enforcement arm of the INS, responsible for guarding the U.S.'s 6,000 miles of land borders against the influx of undocumented immigrants. Statistics on apprehensions of illegal aliens began to be collected in 1925.

The last major immigration action prior to World War II was the country's first "legalization" program, adopted in 1929 for the purpose of accommodating those long-term illegal resident aliens who were not legally admissible for residence. This program applied to aliens who had entered the country before June 3, 1921. The so-called "registry" date has periodically been updated; in 1986 it was moved from June 30, 1948, to January 1, 1972.

Economic and political realities during World War II, combined with reduced immigration levels during the Depression, forced a relaxation of U.S. immigration policy in the 1940s. In 1941 China became a wartime ally against Japan, and two years later the United States repealed the 1882 Chinese exclusion laws.

Moreover, partly to relieve U.S. wartime labor shortages and partly to legalize and control the influx of Mexican agricultural workers, the United States in 1942 began the Bracero guest-worker program. Through a series of bilateral agreements primarily with Mexico but also with Barbados, Jamaica, and British Honduras, the United States admitted temporary

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agricultural workers to pick crops in Western states. But this program apparently did little to stem the flow of illegal farm workers. During the 1940s the number of illegal aliens apprehended by the INS totaled 1.4 million, in contrast to fewer than 150,000 during the 1930s.

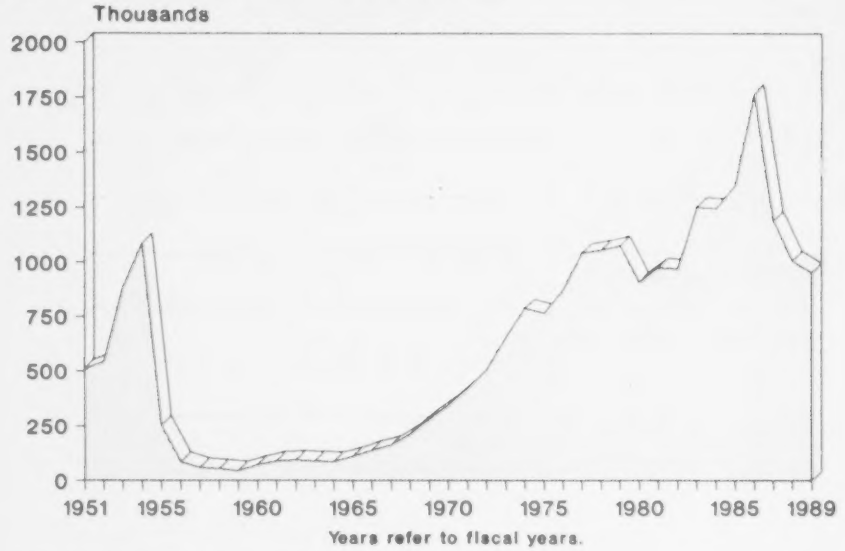
The Period Since 1950

By the early 1950s, mounting pressure to revisit U.S. immigration policy led to passage of the Immigration and Nationality Act (INA) in 1952. Although extensively revised since then, the INA is still the basic law governing U.S. immigration policy. As originally passed, it reaffirmed the national-origins system and established a preference system for skilled workers and for relatives of U.S. citizens and permanent resident aliens.

It also stipulated penalties, including fines and imprisonment, for persons found guilty of "harboring" illegal aliens, suggesting just how seriously the problem of illegal immigration was viewed at the time. However, in an apparent concession to Texas agricultural interests, the INA's "Texas Proviso" exempted employers of illegal aliens from these penalties. Not until 1986 would it be unlawful under federal law for undocumented immigrants to work in the United States *and* for U.S. employers to hire them knowingly.

In the three years from 1951 to 1953, nearly 2 million aliens were apprehended in the United States—far more than the recorded number apprehended in all prior years combined (see Figure 1). By 1954 the illegal alien problem was perceived as so serious that the U.S. Border Patrol launched "Operation Wetback," during which more than 1 million undocumented Mexican migrants, together with some persons who were U.S. citizens, were rounded up and deported back to Mexico. Within five years the number of illegal alien apprehensions dropped by 95 percent to fewer than 50,000 in 1959. But the flow did not stop completely. The Texas Proviso remained a loophole for illegal immigrants from Mexico, and in the 1960s, apprehensions of illegal migrants began growing once again.

Figure 1. Aliens Apprehended 1951-1988



Source: Immigration and Naturalization Service.

The increase accelerated after 1964 when Congress terminated the Bracero program in the face of public opposition to conditions under which migrant workers lived, the influence of the U.S. civil rights movement, and the effective lobbying of labor, church, and ethnic groups. In the 22 years of its existence, the Bracero program authorized the entry of between 4 and 5 million temporary agricultural workers. When it ended, job-seeking Mexicans who had grown accustomed to working in the United States found they no longer had any legal means of entry, but continued to come illegally. In this sense, the agricultural workers who came from Mexico following World War II, some legally as Braceros and others illegally, can be seen as the predecessors of today's undocumenteds.

The 1965 amendments to the INA barely touched the question of illegal immigration. However, they did abolish the national-origins quota system, ending discrimination against immigrants from Asia and Southern and Eastern Europe. Second, they led to the first fixed ceiling on immigration from the Western Hemisphere. And third, the 1965 amendments expanded the preference system for allocating immigrant visas to a seven-category system favoring close relatives of U.S. citizens and permanent resident aliens, those with needed occupational skills, and refugees.

Throughout this and subsequent periods, illegal alien apprehensions rose swiftly and reached a total of 8.3 million for the decade of the 1970s. The increase continued during the 1980s, reaching an all-time annual high of nearly 1.8 million in Fiscal Year 1986.

IRCA Arrives

Armed with the widespread belief that the United States had "lost control of its borders" and backed by apparent public support for "doing something" about the illegal alien problem, Congress in October 1986 passed the Immigration Reform and Control Act (IRCA), and President Reagan signed the legislation into law that November. IRCA's primary objectives

Continued on next page

are to curb, if not eliminate, the flow of undocumented immigrants into the country and to decrease the number of undocumented aliens residing in the United States.

To accomplish these goals, IRCA includes new employer sanction measures to restrict the hiring of undocumented workers, legalization programs to which upwards of 3 million undocumented immigrants applied before the deadlines expired, and stepped-up enforcement at the southern U.S. border against future illegal migration.

Uncertainty continues as to whether IRCA is having its intended effect. The volume of total INS apprehensions declined from 1.77 million in FY 1986 to 1.19 million in FY 1987—a drop of 33 percent in one year. Data for FY 1988 show a further decrease to 1.01 million apprehensions, and newly compiled figures for FY 1989 indicate that the decline in total apprehensions has continued, down to 954,000.[1]

To INS officials, the decline between 1986 and 1988 in Border Patrol apprehensions shows that the new law is working. Critics charge, however, that IRCA has had little or no impact on the flow of undocumented aliens and that apprehension statistics are down because Border Patrol officers have been diverted to other assignments, including hunting for drug smugglers. It is also argued that IRCA's legalization programs have reduced the pool of potential undocumented migrants because many persons who previously went back and forth illegally across the U.S.-Mexican border now cross legally or may have taken up permanent residence in the United States.[2]

Implementation studies of IRCA's effectiveness indicate that despite a $400 million rise in appropriations to expand Border Patrol personnel by 50 percent over 1986 levels, much of the extra expenditure has yet to be directed to an increase in enforcement activities focusing on illegal immigration. In the two years since IRCA's passage, many Border Patrol agents were drawn off into "employer education programs" designed to explain to U.S. employers their new responsibilities under IRCA.[3]

The Future

Little is yet known about IRCA's full impact on the size of the illegal alien population resident in the United States. This population appears to have increased by roughly 2 or 3 million during the 1970s, growing from less than 1 million in 1970 to a total in 1980 of somewhere between 2 and 4 million, with Mexican nationals making up about 55 or 60 percent of the total. This range of figures is considerably narrower than, and the level is substantially below, prior estimates.

Regarding annual growth in the stock of illegal aliens residing in the United States, the most recent best estimates put the average increase somewhere between 100,000 and 300,000 per year from 1980 to 1986, with 200,000 being the generally accepted figure. Since IRCA became law, this net flow is believed to have been cut to between 100,000 and 200,000.[4]

Taking into account IRCA's legalization programs to which more than 3 million undocumented immigrants applied, INS projects that the illegal population in the country could fall from between 4 and 5 million in 1987 to between 1.8 and 3.1 million at the time of the 1990 Census. If this projection materializes, then the change in the size of the U.S. resident illegal population between 1980 and 1990 will be relatively slight, due in large part to IRCA's impacts.

Looking beyond 1990, whether IRCA achieves the aims its supporters intended will be influenced by various challenges that face it, including: (1) domestic economic expansion and tightening U.S. labor markets, (2) projected rapid growth in those service occupations that are traditionally believed to be employers of undocumented migrants, (3) declining U.S. youth cohorts entering the labor force, (4) mounting labor pressures in the Caribbean Basin, and (5) enforcement and compliance issues.[5]

At the same time, several factors could work in IRCA's favor. First, no economic expansion lasts forever. When the next set of recessionary pressures emerge and unemployment rates rise from their current levels, these trends would likely relieve some of the present tightness of domestic labor markets and simultaneously reduce incentives for undocumented immigration. Second, automation in the service sector may reduce job opportunities for unskilled workers. Third, proposed reforms of U.S. legal immigration policy may lift some of the pressure from illegal immigration. Under new provisions passed by the U.S. Senate in July 1989 (but not yet considered by the House of Representatives), the number of immigrant visas reserved for members of the professions or for workers in skilled or unskilled occupations that are in short supply would be increased from 54,000 each year to 150,000. To the extent that persons who might otherwise come illegally possess the kinds of skills, education, and training sought, the proposed legislation may open up new avenues for legal entry into the United States, thereby reducing the flow of undocumented workers.

The question nonetheless remains whether IRCA will have its intended effect of curbing undocumented immigration. It seems unrealistic to think that differentials between sending countries and the United States, in both perceived and actual socioeconomic opportunities, will cease to motivate migrants seeking a better life. If this assessment is correct, then IRCA will not be the last chapter in the history of U.S. policy measures designed to control the flow of illegal immigrants into the country.

Acknowledgments: Conversations with Michael Hoefer, Robert Warren, and other members of the U.S. Immigration and Naturalization Service's Statistics Division have contributed to the author's understanding of this subject. Thanks are also extended to Diane Van Houten for assistance in preparing the final manuscript.

Editor's note: Because of space limitations, the text and list of references have been shortened from the original. A complete copy may be obtained from the author.

Notes

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2. Roberto Suro. "1986 Amnesty Law is Seen as Failing to Slow Alien Tide." *New York Times*, June 18, 1989, Sec. 1, p. 1.
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SOFTWARE

MaCATI is a full-featured telephone interviewing package for the Macintosh personal computer. It contains the basic features of other Computer Assisted Telephone Interviewing (CATI) packages for personal computers or minicomputers but with greater ease and much lower price.

MaCATI (pronounced Mah-KAY-tee) is designed to manage the creation and operation of surveys conducted by phone, e.g., market research or political polling. The program can be used to write the survey questionnaire, which can then be transferred to the interviewers' own Macintosh workstations.

Pulling the questionnaire up on the screen, interviewers can then make the survey calls with and code the answers using the keyboard or mouse. (Loading phone files purchased from a vendor, the programs can also automatically dial phone numbers and keep track of "used" or invalid numbers.)

Once the survey data have been collected, they can be transferred to a master file and tallied using MaCATI, or easily exported to other software programs for specialized analysis or report writing.

MaCATI for 1 to 2 Macintoshes functioning as workstations is priced at $795; 3 to 10, $2,195. For pricing on higher numbers of workstations or other information, contact: PSRC Software, Population and Society Research Center, Bowling Green State University, Bowling Green, Ohio 43403. Phone 419-372-8648.

—*A.H.*

POPULATION UPDATE

Estimated United States Population:

As of November 1, 1989	249,736,000
As of November 1, 1988	247,249,000

The above estimates include armed forces overseas and are from U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1051.

Estimated World Population:

As of February 1990	5,288,000,000
Annual growth	93,000,000

Extrapolated from the mid-1989 population on PRB's *1989 World Population Data Sheet*.

Latest Provisional Statistics for the U.S.: September 1989

	12 months ending with September					
	Number		Rate			
Item	1989	1988	1989	1988	1987	1986
Live births	3,941,000	3,890,000	15.9	15.9	15.6	15.6
Deaths	2,143,000	2,171,000	8.7	8.9	8.7	8.7
Natural increase	1,798,000	1,719,000	7.2	7.0	6.9	6.9
Marriages	2,388,000	2,374,000	9.6	9.7	10.0	9.9
Divorces	1,157,000	1,171,000	4.7	4.8	4.8	4.8
Infant deaths	38,800	38,700	9.9	10.0	10.0	10.5
Population base (in millions)	...	...	247.6	245.0	242.7	240.4

Note. Rates are given per 1,000 population, except for infant deaths, which are given per 1,000 live births.

Source. Monthly Vital Statistics Report (Vol. 38, No. 9) from the National Center for Health Statistics.

LETTER TO THE EDITOR

In 1960, Heinz von Foerster et al. published an article in *Science* describing a mathematical formula they had created that "fit" the graph of human population growth during the past 2,000 years.[1]

The expression they gave was:

$$N = \frac{1.79 \times 10^{11}}{(2026.87 - t)^{.99}} \qquad (1)$$

where N is population at t years A.D.

This is an abstract mathematical expression. Nevertheless, estimated world population data has fit the formula rather well during the last 2,000 years. For example, the Population Reference Bureau's estimate of world population in 1900 is 1.62 billion. Making the formula's t equal to 1900 results in a product of 1.48 billion—reasonably close. Similarly, the formula's figure for 1989 is 4.9 billion (compared to PRB's 5.2 billion estimate).

It is in the future that the formula starts to diverge markedly from conventional projections. So much so that, by its projections, world population would reach infinity on Friday, Nov. 13, 2026—an alarming statistical prospect.

By itself, a best-fit empirical equation is not remarkable. An equation can always be fit to a set of data if the number of parameters is sufficiently large. This equation's appeal is that using relatively few parameters, it projects world population totals across a broad range of the past quite well.

Clearly, though, this expression as presently constituted starts to deviate greatly from reality as population size increases past a certain point. The variance between the "good fit" with past data and the absurdly infinite future total would seem to doom such a formulaic approach to population projection.

Improvements, however, are possible in the von Foerster expression. Equation 1 can be reduced to

$$\frac{dN}{dt} = rN^{2.01} \qquad (2)$$

where $\frac{dN}{dt}$ is the instantaneous rate of population increase, r is an intrinsic rate of natural increase, with N being population size at t years A.D.

With the addition of a single additional parameter—carrying capacity—the equation can be altered so that it still "fits" past populations while projecting a leveling off in future population totals:

$$\frac{dN}{dt} = rN \cdot \left(1 - \frac{N}{K}\right) \qquad (3)$$

where K equals potential carrying capacity in number of people. (Both K and r are parameters explicitly fit to the data. The reader interested in understanding equations of population dynamics is referred to Ehrlich et al.)[2]

This new equation fits the past estimates as well as, or more exactly than, von Foerster's did. (For example, it produces a value of 5.1 billion for 1989 world population.)

Our equation also limits future population to a maximum carrying capacity and avoids the incredible result of Equation 1. Incorporating present population data into the equation results in an ultimate K of between 7.5 and 11 billion. As it happens, this projected saturation value comes close to recent UN and World Bank projections that show present trends in fertility decline resulting in stable populations of approximately 10.2 and 10.4 billion, respectively.

Equation 3 is not intended to replace empirical demographic methods, which track differences in K and r over time. It merely expands on previous observations on the nature of growth, while reflecting the realistic contingency of a saturation of the earth's population carrying capacity, given present conditions. It is important to note that as technology has advanced through cultural, agricultural, and industrial revolutions, the human population limits and carrying capacities have changed, and with them the saturation value K. (See Reference 2.) Hence it would be premature to think that one equation today can accurately summarize the human complexity. Only time can determine what factors are governing human population growth.

—Ariel Flat and Greg Smestad
Hewlett-Packard Co., San Jose, Calif.

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ADDENDA

Signs of the Aging of America–VIII

Popu-
lation Today
last month switched
to Franklin Gothic Book 10-point
type—a larger, clearer text font than the 10-point
Optima formerly employed—and a boon for those suffering from presbyopia as a result of the natural aging of the eye's lens which makes focusing on near, small type more difficult than before, though if you can read this without a microscope you are much too close

CURRENT READINGS

PRB welcomes materials on population topics for possible inclusion in Current Readings. Publishers may address review copies to Book Review Editor, POPULATION TODAY, Population Reference Bureau, 777 14th St., N.W., Washington, D.C. 20005.

ADDRESS UNKNOWN: The Homeless in America, by James D. Wright. Hawthorne, N.Y.: Aldine de Gruyter, 1989. 170 pages. $36.95. ISBN 0-202-30364-0.

Address Unknown stands out in the flood of recent publications about homelessness in U.S. cities. It offers an empirically grounded, well-written synthesis of current knowledge about this national problem.

Its author, sociologist James Wright, has conducted a series of studies on homeless people, including a study, featured prominently in this book, of participants in the 19-city "health care for the homeless" program. In *Address Unknown* he also relies heavily on a 1985-1986 survey of Chicago's homeless that is described in another recent, notable book: Peter H. Rossi's *Down and Out in America: The Origins of Homelessness* (University of Chicago Press, 1989).

Despite the proliferation of studies of the homeless, their overall number remains unknown. This is partially due to the difficulty of defining homelessness. Wright distinguishes between the marginally housed, who have a tenuous hold upon whatever minimal accommodations they have, and the homeless. Literally homeless means "those people who, on a given night, have nowhere to go . . . people who sleep out on the streets or who would sleep out on the streets except that they avail themselves of beds in shelters, missions, and other facilities set up to provide space for otherwise homeless people."

Wright's book is about the literally homeless. Estimates of the number of homeless vary widely, and Wright notes that the few studies that have tried systematically to count people at night in shelters and on the street have invariably found fewer persons than were expected.

Reviewing six such studies, Wright shows that in a given city, the number of homeless on a given night is likely to be between ½ percent and 2½ percent of the city's population in poverty. In the course of a year, the total number of persons who are ever homeless is likely to be about three times the number found on a given night. For the whole country, Wright estimates that there are about a half million homeless on a given night and 1½ million who experience homelessness during the course of a year.

Wright presents a demographic profile of the homeless by describing the characteristics of a typical 1,000 homeless persons: 146 of them are children age 19 or younger; 99 of these children are in family groups with their mothers, and 47 are homeless teenagers on their own.

The 1,000 homeless persons include 156 females who are not in family groups and 580 unaffiliated adult males, the largest category. There are very few homeless persons over the age of 65, so the adult population is youthful. Wright stresses the point that almost a quarter of the homeless people are in family groups. The homeless population overrepresents blacks, Hispanics, and native Americans. The homeless are not uneducated: Over half have completed high school and one in five has gone to college for at least a year. In sum, no single image suffices to describe a homeless person; except for sharing deep poverty, the population is heterogeneous.

About half of all homeless persons receive some form of social welfare benefits; the other half subsists with no help from the government. The proportion receiving benefits varies widely among cities, depending upon differing state eligibility requirements. While welfare benefits may be available for mothers, children, disabled, and elderly persons, they are unavailable for the most common category of homeless person, the adult male. The purchasing power of welfare benefits is so meager that they are inadequate to cover rent payments.

Homelessness has increased, because of the collision of two socioeconomic trends: an increase in the number of persons in poverty (from 24.7 million in 1977 to 32.5 million in 1987, according to Census Bureau estimates) and a decrease in the number of cheap rental housing units in cities. At the micro-level, he explains, poor persons who lack social connections, particularly family, may fall into homelessness.

In a flood of volumes about homelessness, what is distinctive about *Address Unknown*? The presentation is well balanced, it reviews the popular single-cause explanations of homelessness, like alcoholism, drugs, and deinstitutionalization of mental patients—and puts them into a broader social perspective. This book is consistently grounded in high-quality survey research. And, while Wright writes from a humane, sympathetic point of view, he is neither mawkish nor starry-eyed.

—Harvey M. Choldin

SPOTLIGHT

ZAMBIA

Population (mid-1989): 8.1 million
Land area: 290,580 sq. miles
Births per 1,000 pop.: 51
Deaths per 1,000 pop.: 18
Rate of Natural Increase: 3.7 percent
Total Fertility Rate: 7.2 children per woman
Infant Mortality Rate: 84 deaths per 1,000 live births
Life Expectancy Rate: 52 years
GNP per capita (1987 est.): $240
Capital: Lusaka

by Gwenda Brophy

Formerly Northern Rhodesia, Zambia obtained independence from Britain 25 years ago. This landlocked Eastern Africa country of 8 million people has a rate of population growth of 3.7 percent, exceeded only by Kenya on the continent, and implying a population doubling time of just 19 years. In recent years there has been increasing awareness of population issues and in 1987 a population policy was drafted, one objective of which was to establish population planning, coordination, and monitoring.

Average completed family size is over 7 children, and modern contraceptive usage remains extremely low, around 1 percent. As of 1984, the average age of contraceptive acceptors in the capital city of Lusaka was 24 years; almost half of acceptors had only 1 or 2 children, suggesting that birth spacing is the rationale.

The predominant method was the pill, more a reflection of the range of methods available, since few facilities were able to offer a comprehensive range on a regular basis. Recently there have been innovative methods of communicating messages about population growth and family planning with street theater.

Legal induced abortion has been available since 1977 for a broad range of social and economic reasons, an unusual situation in Africa.

The country is currently facing very serious economic problems which have resulted in chronic shortages of essential goods, high unemployment (some 2 million Zambians, a quarter of the population, are estimated to be unemployed), and rising crime.

When it became in dependent, Zambia inherited what was then black Africa's largest industrial base. Zambia is heavily reliant on copper mining, and was badly hit by the fall in prices for the metal since 1975, contributing to increasing foreign debt, a fall-off in economic activity, and declining living standards. The country has recently renewed links with the International Monetary Fund, and begun economic policy changes.

With 48 percent of the population living in urban areas along the "copper belt" in the north and in Lusaka, it is one of black Africa's most urbanized countries. But migration from the countryside to the towns has started to move into reverse, and more people are returning to subsistence farming.

Half of Zambia's population is under 15 years of age—placing huge demands on education and health provision; however, government spending in key areas has fallen in recent years, on education by 62 percent in 10 years, and on essential drugs by 75 percent in the last four years. The economic plight has led to a sharp increase in nutrition-related child mortality.

The state of the economy is not Zambia's only problem. AIDS cases are increasing, and President Kenneth D. Kaunda, whose son died from AIDS, has called for a national emergency program on AIDS education and preventive measures. Meanwhile, the depletion of young, educated, and professional people continues—more than 7,000 of the 12,000 postindependence university graduates have left the country.

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